Report Date: 30 Apr 2012

Summary Report for Individual Task
551-88L-3049
Troubleshoot a POL Centrifuge
Status: Approved

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

DESTRUCTION NOTICE: None

Condition: Aboard a vessel, at sea, at anchor or moored alongside a pier, day or night, under all sea and weather conditions, using the Alfa Laval trouble-tracing instructions in the System Manual, and while wearing appropriate PPE, (i.e. hearing protection, Nitrile gloves, eye protection, etc.) with no injuries and/or damage to equipment.

Standard: The Soldier knows the troubleshooting procedures of the purifier and correctly conducts troubleshooting procedures pertaining to thePOL Centrifuge.

Special Condition: None

Special Standards: None

Special Equipment:

Safety Level: High

MOPP:

Task Statements

Cue: None

DANGER

None

WARNING

None

CAUTION

None

Remarks: None

Notes: None

Performance Steps

1. Demonstrate basic knowledge for troubleshooting procedures of the centrifuge.

a. The following applies to troubleshooting concerning functions of the centrifuge only. It does not include the other equipment in the processing system.

b. Always start with trouble-tracing instructions in the System Manual, and if required, continue with the instructions below. If the problem still is not solved, contact your POL Centrifuge representative.

2. Demonstrate basic knowledge for troubleshooting mechanical functions of a centrifuge (refer to Figures 551-88L-3049_01 thru 05).

a. The centrifuge does not start.

(1) Possible cause.

(a) No power supply to the motor.

(b) Bowl lock screws stopping rotation.

(2) Actions to take.

(a) Check power supply.

(b) Release the lock screws.

b. Start-up time too long.

(1) Possible cause.

(a) Brake applied.

(b) Friction pads worn or oily.

(c) Motor failure.

(d) Incorrect power supply (50 Hz instead of 60 Hz).

(e) Bearings damaged or worn.

(2) Actions to take.

(a) Release the brake.

(b) Fit new or clean the friction pads.

(c) Repair or replace the motor.

(d) Use the correct power supply.

(e) Install new bearings.

c. Starting power too low.

(1) Possible causes.

(a) Motor failure.

(b) Friction pads worn.

(c) Friction pads oily.

(2) Actions to take.

(a) Repair or replace the motor.

(b) Fit new friction pads.

(c) Clean or fit new friction pads.

d. Starting power too high.

(1) Possible causes.

(a) Bowl lock screws stopping rotation.

(b) Brake is on.

(c) Motor failure.

(d) Gear worn out.

(e) Bearing damaged or worn.

DANGER

Incorrect transmission is a disintegration hazard, STOP Centrifuge immediately.

(f) Incorrect transmission (50 Hz gear and 60 Hz power supply).

(g) Wrong direction of rotation.

(2) Actions to take.

(a) Release the lock screws.

(b) Release the brake.

(c) Repair or replace the motor.

(d) Replace the worn wheel and worn gear.

(e) Install new bearings.

(f) STOP immediately! Install correct transmission.

_1_ Contact your Centrifuge representative.

_2_ The bowl MUST be inspected.

(g) STOP. Adjust motor power connection.

e. Centrifuge vibrates excessively during the starting sequence.
Note: Some vibration is normal during starting sequence when the centrifuge passes through its critical speeds.

(1) Possible causes.

DANGER

An out of balance bowl is a disintegration hazard, STOP the centrifuge immediately.

(a) Bowl out of balance due to:

_1_ Poor cleaning.

_2_ Incorrect assembly.

_3_ Too few discs.

_4_ Insufficiently tightened bowl hood.

_5_ Bowl assembled with parts from other centrifuges.

(b) Vibration dampers in frame feet worn out.

(c) Bowl spindle bent (max. 0.15 mm).

(d) Top and/or bottom bearing damages or worn.

(e) Top bearing springs defective.

(2) Actions to take.

(a) STOP immediately! Identify and rectify cause.

(b) Fit new vibration dampers.

(c) Fit a new bowl spindle.

(d) Fit new bearings.

(e) Fit new springs.

f. Centrifuge vibrates excessively during normal running.

(1) Possible causes.

(a) Uneven sludge deposits in sludge space.

(b) Bearings damaged or worn.

(c) Vibration-damping rubber washers worn out.

(d) Spindle top bearing spring(s) broken.

(2) Actions to take.

(a) STOP and clean bowl.

(b) Fit new bearings.

(c) Fit new frame feet washers every four years.

(d) Replace all springs.

g. Centrifuge has an unusual smell.

(1) Possible causes.

(a) Normal occurrence during start as the (new) friction blocks slip.

(b) Brake is applied.

(c) Top and/or bottom bearing overheated.

(2) Actions to take.

(a) None.

(b) Release the brake.

(c) Fit new bearings.

h. Centrifuge has an unusual noise.

(1) Possible Causes.

(a) Oil level in oil sump is too low.

(b) Top and/or bottom bearing damaged or worn.

(c) Friction pads worn.

(2) Actions to take.

(a) STOP and read oil level and add oil.

(b) Fit new bearings.

(c) Fit new friction pads.

i. Centrifuge speed too high.

(1) Possible causes.

DANGER

Incorrect transmission is a disintegration hazard, STOP centrifuge immediately.

(a) Incorrect transmission (50 Hz gear running on 60 Hz power supply).

(b) Frequency of power supply to high.

(2) Actions to take.

(a) STOP immediately! Install correct transmission.

_1_ Contact your Centrifuge representative.

_2_ The bowl MUST be inspected.

(b) Check frequency.

j. Centrifuge speed too low.

(1) Possible causes.

(a) Brake is on.

(b) Friction pads worn or oily.

(c) Motor failure.

(d) Top and/or bottom bearings damaged or worn.

(e) Bearing overheated/damaged.

(2) Actions to take.

(a) Release the brake.

(b) Fit new friction pads or clean the old ones if they are oily.

(c) Repair or replace the motor.

(d) Fit new bearings.

(e) Fit new bearings.

k. Stopping time too long.

(1) Possible causes.

(a) Brake lining worn.

(b) Brake lining oily.

(2) Actions to take.

(a) Fit new friction pads.

(b) Clean the old ones if they are oily.

l. Water in oil sump.

(1) Possible causes.

(a) Bowl casing drain obstructed.

(b) Leakage at top bearing.

(c) Condensation.

(2) Actions to take.

(a) Clean. Change oil.

(b) Fit a new seal ring and change oil.

(c) Clean the oil sump and change oil.

m. Liquid flows through bowl casing drain.

(1) Possible causes.

(a) Broken water seal.

(b) Too high throughput.

(c) The supply of displacement/sealing water is not sufficient due to clogged strainer, kinked hose or low water pressure.

(d) Seal ring on gravity/centrifuge disc defective.

(e) Bowl hood seal ring defective.

(f) Bowl speed too low.

(2) Actions to take.

(a) Stop feed and feed water to create water seal.

(b) Reduce the feed.

(c) Straighten the hose or clean the strainer.

_1_ Check and adjust the water pressure.

_2_ Water pressure must be 200-600 kPa (29-87 psi).

(d) Fit a new seal ring.

(e) Fit a new seal ring.

(f) Make sure current is on and brake is off.

_1_ Inspect motor.

_2_ Inspect power transmission.

3. Demonstrate basic knowledge for troubleshooting purification faults.

a. Unsatisfactory purification result.

(1) Possible causes.

(a) Gravity disc hole too small.

(b) Incorrect separating temperature.

(c) Throughput too high.

(d) Sludge space in bowl is filled.

(e) Disc stack clogged.

(f) Bowl speed too low.

(2) Actions to take.

(a) Use a gravity disc with a larger hole.

(b) Adjust temperature.

(c) Reduce throughput.

(d) Empty the sludge basket in the bowl.

(e) Clean the bowl discs.

(f) Correct the speed. See “paragraph 2.j. Separator speed too low”.

b. Outgoing water contaminated by oil.

(1) Possible causes.

(a) Gravity disc hole too large.

(b) Seal ring under the gravity disc defective.

(2) Actions to take.

(a) Use a gravity disc with a smaller hole.

(b) Fit a new seal ring.

c. Broken water seal.

(1) Possible causes.

(a) Gravity disc too large.

(b) Separation temperature too low.

(c) Throughput too high.

(d) Sealing water volume too small.

(e) Seal ring under gravity disc defective.

(f) Disc stack clogged.

(g) Bowl speed too low.

(h) Bowl incorrectly assembled.

(2) Actions to take.

(a) Use a gravity disc with a smaller hole.

(b) Increase temperature.

(c) Reduce throughput.

(d) Supply more water.

(e) Fit a new seal ring.

(f) Clean the bowl discs.

(g) Correct the speed. See “paragraph 2.j. Separator speed too low”.

(h) Examine and make correct.

4. Demonstrate basic knowledge for troubleshooting clarification faults.

a. Unsatisfactory clarification result.

(1) Possible causes.

(a) Separating temperature too low.

(b) Throughput too high.

(c) Feed oil contains water.

(d) Disc stack clogged.

(e) Sludge space in bowl filled.

(f) Bowl speed to low.

(2) Actions to take.

(a) Adjust temperature.

(b) Reduce throughput.

(c) Re-assemble and operate the centrifuge as a purifier.

(d) Clean the bowl discs.

(e) Empty the sludge basket.

(f) Correct the speed. See “paragraph 2.j. Separator speed too low”.

b. Oil discharge through water outlet.

(1) Possible causes.

(a) Valve(s) in outlet line closed.

(b) Disc stack clogged.

(c) Seal ring under gravity disc is defective.

(d) Bowl incorrectly assembled.

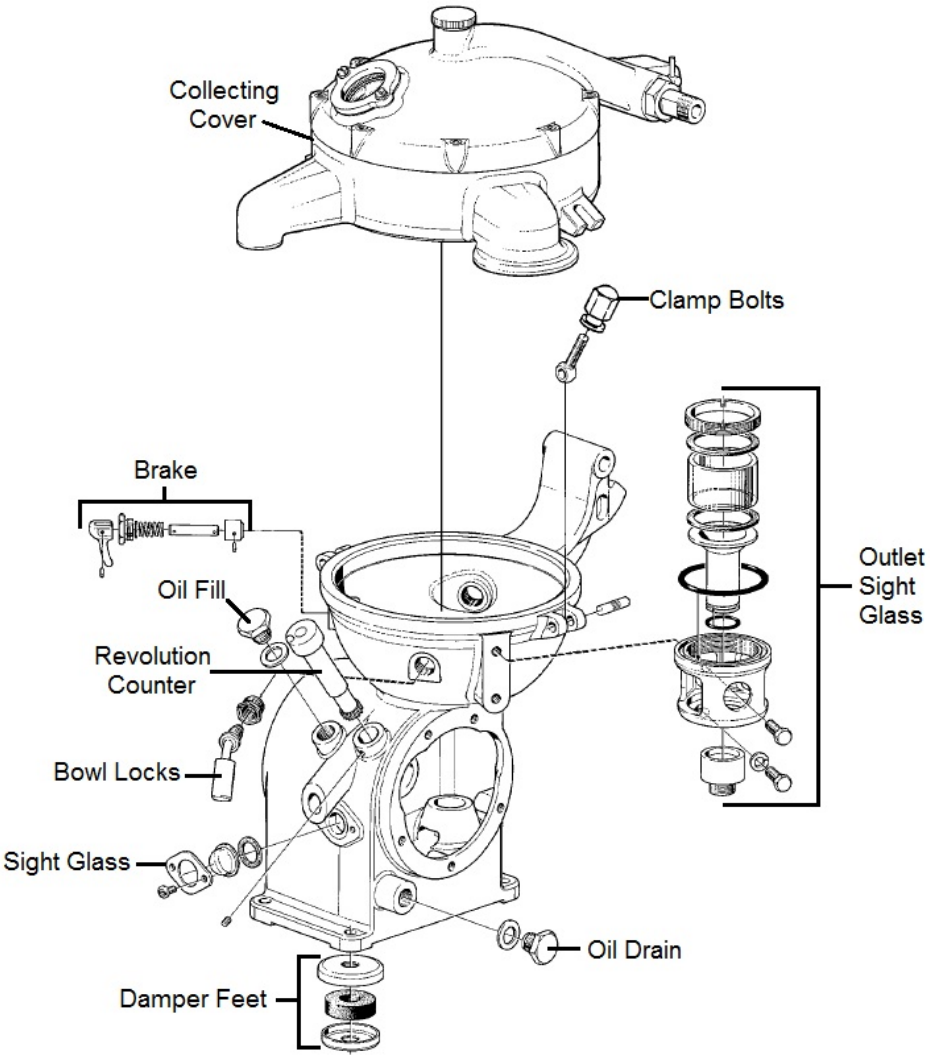
(2) Actions to take.

(a) Open the valve(s) and adjust to normal back pressure.

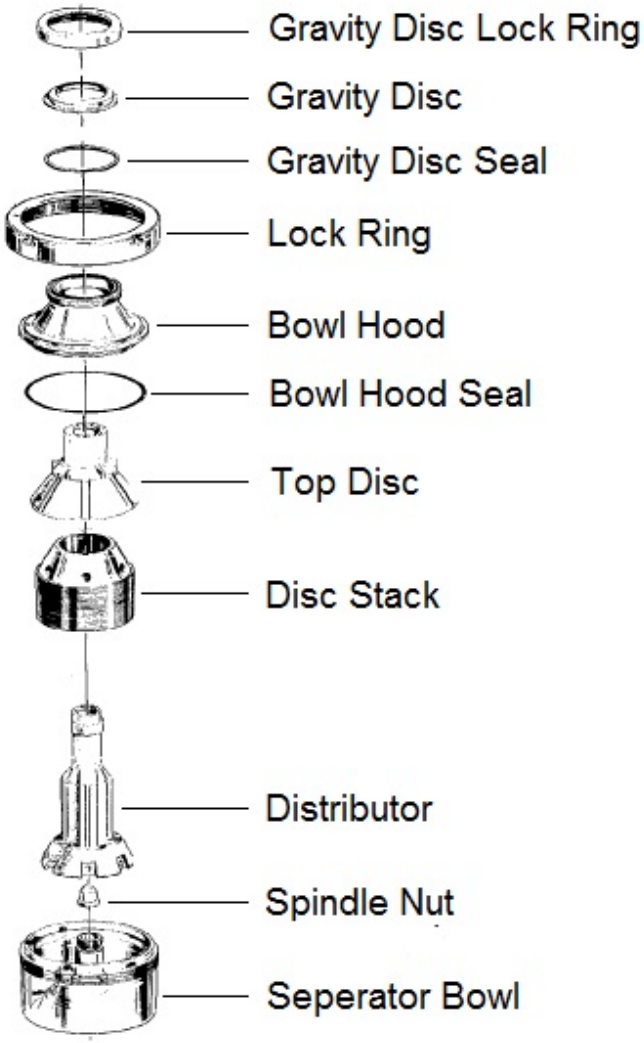
(b) Clean the bowl discs.

(c) Fit a new seal ring.

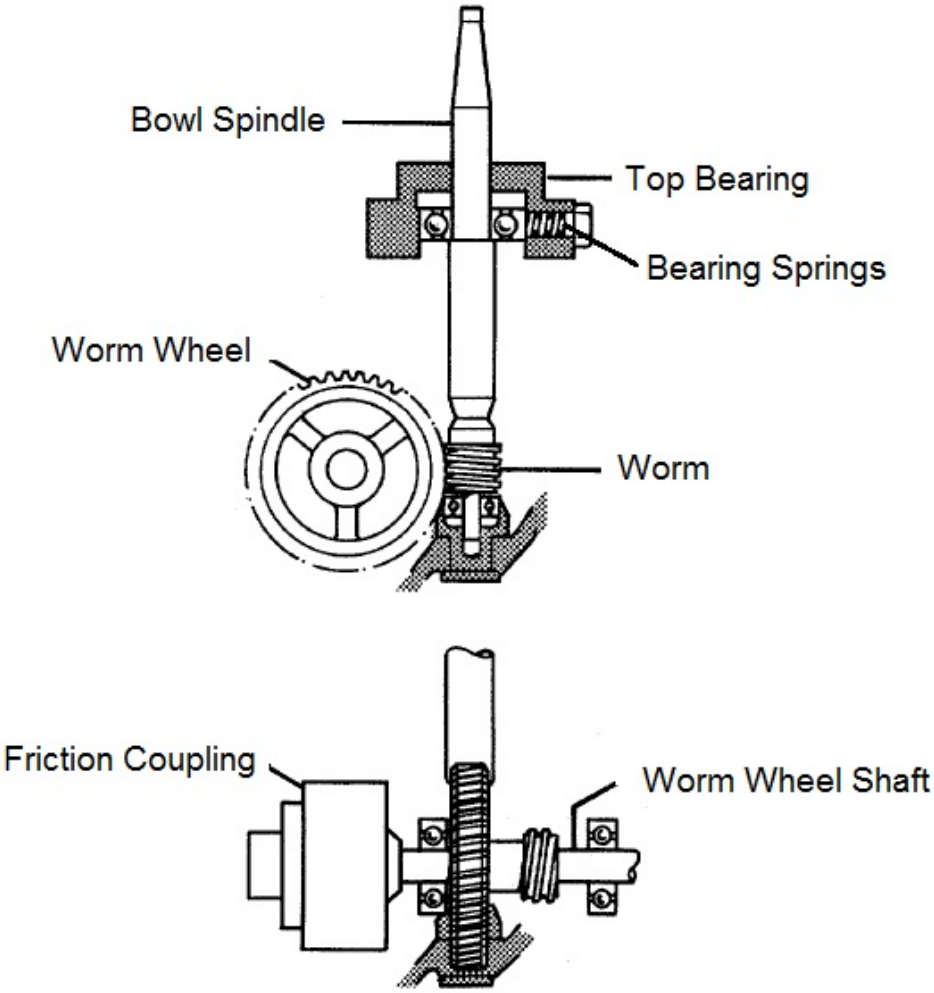
(d) Examine and make correct.



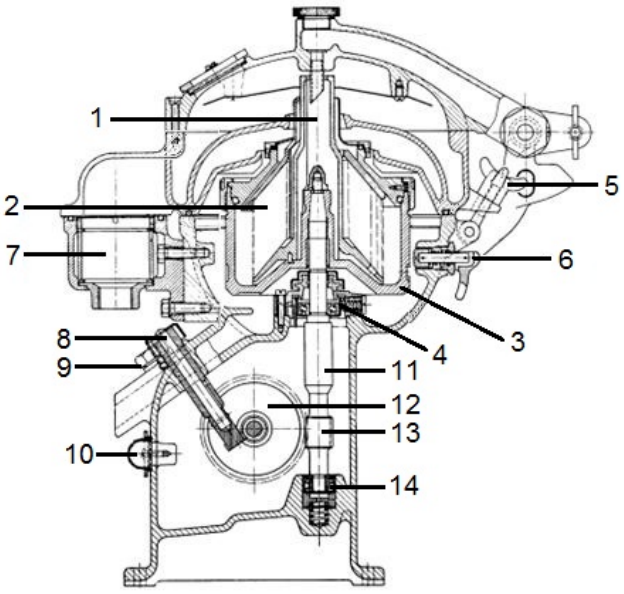
Centrifuge Exploded View
Figure 551-88L-3049_02



Centrifuge Bowl Assembly
Figure 551-88L-3049_05

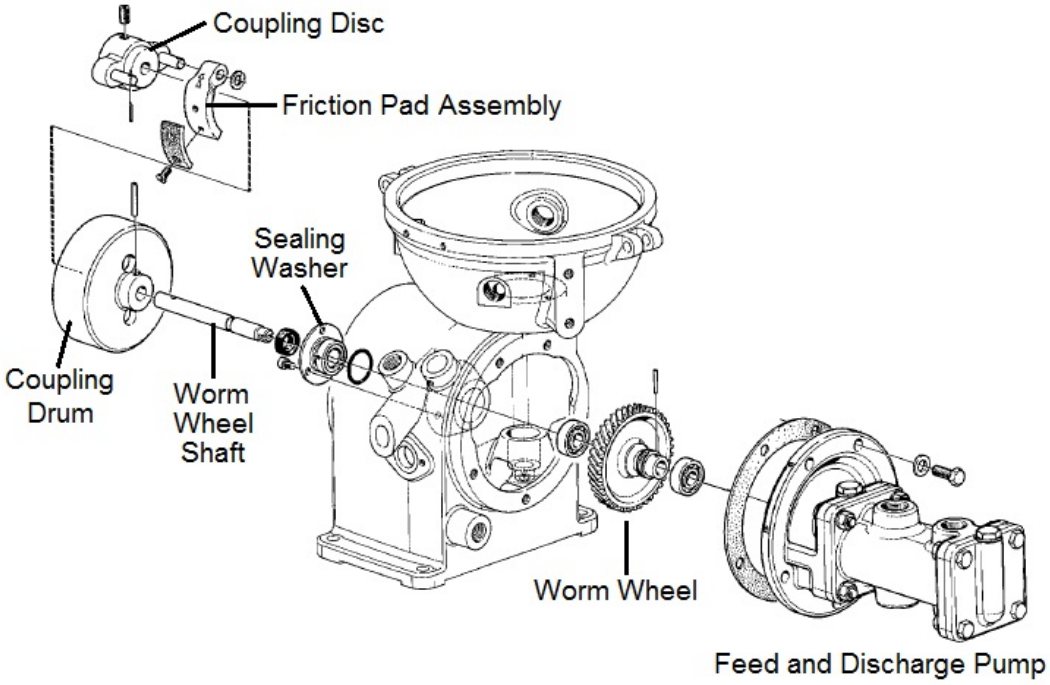


Verticle Drive Assembly
Figure 551-88L-3049_04



1 Distributor
2 Disc Stack
3 Seperator Bowl
4 Upper Bearing and Springs
5 Clamp Bolt
6 Brake
7 Oulet Sight Glass
8 Revolution Counter
9 Oil Fill Plug
10 Oil Sight Glass
11 Verticle Drive Shaft
12 Worm Wheel
13 Worm Gear
14 Lower Bearing

Centrifuge Cross Section
Figure 551-88L-3049_01



Inlet and Outlet Pump
Figure 551-88L-3049_03

(Asterisks indicates a leader performance step.)

Evaluation Preparation: None

PERFORMANCE MEASURES	GO	NO-GO	N/A
1. Demonstrated basic knowledge for troubleshooting procedures of the centrifuge.			
2. Demonstrated basic knowledge for troubleshooting mechanical functions of a centrifuge.			
a. The centrifuge does not start.			
b. Start-up time too long.			
c. Starting power too low.			
d. Starting power too high.			
e. Centrifuge vibrates excessively during the starting sequence.			
f. Centrifuge vibrates excessively during normal running.			
g. Centrifuge has an unusual smell.			
h. Centrifuge has an unusual noise.			
i. Centrifuge speed to high.			
j. Centrifuge speed to low.			
k. Stopping time too long.			
l. Water in oil sump.			
m. Liquid flows through bowl casing drain.			
3. Demonstrated basic knowledge for troubleshooting centrifuge faults.			
a. Unsatisfactory separation result.			
b. Outgoing water contaminated by oil.			
c. Broken water seal.			
4. Demonstrated basic knowledge for troubleshooting clarification faults.			
a. Unsatisfactory separation result.			
b. Oil discharge through water outlet.			

Supporting Reference(s): None

Environment: None

Safety: In a training environment, leaders must perform a risk assessment in accordance with FM 5-19, Composite Risk Management. Leaders will complete a DA Form 7566 COMPOSITE RISK MANAGEMENT WORKSHEET during the planning and completion of each task and sub-task by assessing mission, enemy, terrain and weather, troops and support available-time available and civil considerations, (METT-TC). Note: During MOPP training, leaders must ensure personnel are monitored for potential heat injury. Local policies and procedures must be followed during times of increased heat category in order to avoid heat related injury. Consider the MOPP work/rest cycles and water replacement guidelines IAW FM 3-11.4, NBC Protection, FM 3-11.5, CBRN Decontamination.

Prerequisite Individual Tasks : None

Supporting Individual Tasks :

Task Number	Title	Proponent	Status
551-88L-1026	Demonstrate Basic Knowledge of a POL Centrifuge	551 - Transportation (Individual)	Analysis

Supported Individual Tasks :

Task Number	Title	Proponent	Status
551-88L-1026	Demonstrate Basic Knowledge of a POL Centrifuge	551 - Transportation (Individual)	Analysis
551-88L-2042	Maintain a POL Centrifuge	551 - Transportation (Individual)	Approved

Supported Collective Tasks :

Task Number	Title	Proponent	Status
N/A	N/A	Not Selected	Obsolete